

# PATENT SPECIFICATION

801,659



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**E1C(3B3: 4A2: 4B4: 7B: 13: 17: 18).**

**International Classification:—A61L.**

## COMPLETE SPECIFICATION.

### Improvements in or relating to Fumigating Compositions.

We, THE MURPHY CHEMICAL COMPANY LIMITED, a British Company, of Wheat-hampstead, St. Albans, Hertfordshire, and JOHN LEONARD WALPOLE, a British Subject, of the said Company's address, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to solid self-combustible compositions capable of burning under confined conditions and which are used for vaporising vaporisable pest-controlling substances in order to produce smokes for fumigation purposes. The pest-controlling substance is usually mixed with the self-combustible composition, but it may be separate therefrom and closely adjacent thereto.

Such self-combustible compositions usually comprise a mixture of a combustible material, for example, a carbohydrate such as sucrose or lactose, and a highly oxygenated compound, for example, potassium chlorate, capable of yielding oxygen to support combustion of the combustible material under confined conditions. It is known that in many cases the smoke produced with these self-combustible compositions is liable to inflame on issuing from the container, in which the composition and pest-controlling substance are contained, and that this leads to the partial or complete destruction of the pest-controlling substance. In order to prevent the smoke from inflaming it is known to provide one or more perforated baffles within the container so as to form one or more spaces through which the vapours pass before issuing from the container.

The present invention is based on the observation that a self-combustible com-

position comprising a mixture of melamine (2:4:6 - triamino - 1:3:5 - triazine) or dicyandiamide (cyanoguanidine) with a highly oxygenated compound burns at a sufficiently low temperature to produce a non-inflaming smoke with a pest-controlling substance having a flash point not lower than about 180°C. as determined by the open cup method described in "Standard Methods for Testing Petroleum and its Products" published by the Institute of Petroleum, 11th Edition, 1951, page 221.

Accordingly, the invention provides a self-combustible composition suitable on combustion for vaporising vaporisable pest-controlling substances, which comprises a mixture of melamine or dicyandiamide with a highly oxygenated compound capable of yielding oxygen to support combustion of the melamine or dicyandiamide under confined conditions.

The invention also includes a fumigating composition, which comprises the said self-combustible composition in admixture with a pest-controlling substance having a flash point not lower than that stated above. The fumigating composition may be incorporated in the container of a conventional fumigating device or may be formed into tablets or pellets which are burned directly in the atmosphere to produce smoke. Alternatively, the composition may be charged in loose powdered form into an open container and ignited by means of a match, fusee or a fuse, such as a quickmatch fuse, one end of which is inserted in the composition. For the purpose of storage and transit the open container may have a removable lid or cover. However, instead of mixing the pest-controlling substance with the self-combustible composition, it may be arranged separate therefrom and closely adjacent

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thereto. Thus, the pest-controlling substance may be arranged above or laterally of the self-combustible composition, or it may be contained in one or more receptacles wholly or partially destructible by heat and embedded within the self-combustible composition.

The invention also includes a fumigating device adapted to discharge by combustion the vapour of a pest-controlling substance, which comprises a container in which is incorporated the self-combustible composition and pest-controlling substance either mixed together or arranged separately from one another, and which container has an outlet opening for the vapours. If desired, a fuse for igniting the self-combustible composition may also be provided.

The relative proportions of the highly oxygenated compound and the melamine or dicyandiamide in the self-combustible composition may vary considerably. For example, the proportion of potassium chlorate to melamine or dicyandiamide may range from 0.9 : 1 to 6.5 : 1 parts by weight, and is advantageously within the range of 2 : 1 to 3 : 1.

The term "pest-controlling substance" is used herein to denote an insecticide (including a larvicide, ovicide or acaricide), fungicide, bactericide or similar substance. As examples of pest-controlling substances having flash points not lower than about 180° C., there may be mentioned di-(para-chlorophenyl) - trichlorethane (DDT), benzene hexachloride and para-chlorophenylbenzene sulphonate (PCPBS). Pest-controlling substances which are liquid at ordinary temperature may be absorbed on a suitable absorbent material, such as diatomaceous earth, activated silica or the like, before incorporating them in a fumigating composition.

The self-combustible composition or fumigating composition may also contain a chemically inert material, such as china clay, talc, diatomaceous earth or the like, as a diluent or as an absorbent for a low melting pest controlling substance. Such an addition may also serve to moderate the burning rate and performance of the composition as is well known in the art.

There may also be incorporated in the fumigating composition a stabiliser, such as zinc oxide, magnesium oxide or titanium dioxide, when a pest-controlling substance that tends to decompose during storage with the formation of an acidic product, for example, D.D.T., is present in the composition. This is especially desirable if the composition is to be stored under warm or tropical conditions.

The following Examples illustrate fumigating compositions in accordance with the invention, the ingredients being thoroughly

mixed together in powdered form in the stated proportions either by hand through sieves or in a suitable mixer:

#### EXAMPLE 1.

	Parts by weight.	70
D.D.T. .. .. .	56	
Potassium chlorate .. .. .	56% 24	
Melamine .. .. .	18% 8	
China clay .. .. .	23% 10	
Zinc oxide .. .. .	5% 2	75

The above composition is suitable for the control of White Fly, Tomato Moth, Caterpillar, Capsids, Thrips and other pests under glass.

#### EXAMPLE 2.

	Parts by weight.	80
Para-chlorophenylbenzene sulphonate .. .. .	53	
Potassium chlorate .. .. .	47% 22	
Melamine .. .. .	13% 9	
China clay .. .. .	3% 16	85

The above composition is suitable for the control of the eggs and some adult stages of the greenhouse red spider (*Tetranychus Telarius* L.)

#### EXAMPLE 3.

	Parts by weight.	90
D.D.T. .. .. .	58	
Potassium chlorate .. .. .	33% 16	
Dicyandiamide .. .. .	13% 8	
China clay .. .. .	43% 18	95

The above composition is suitable for controlling the pests given in Example 1.

#### EXAMPLE 4.

	Parts by weight.	100
Para-chlorophenylbenzene sulphonate .. .. .	53	
Potassium chlorate .. .. .	47% 22	
Dicyandiamide .. .. .	21% 10	
China clay .. .. .	23% 13	
Zinc oxide .. .. .	4% 2	105

The above composition is suitable for controlling the pest given in Example 2.

#### WHAT WE CLAIM IS:—

1. A self-combustible composition suitable on combustion for vaporising vaporisable pest-controlling substances, which comprises a mixture of melamine or dicyandiamide with a highly oxygenated compound capable of yielding oxygen to support combustion of the melamine or dicyandiamide under confined conditions.

2. A self-combustible composition as claimed in Claim 1, which comprises 0.9 to 6.5 parts by weight of potassium chlorate in admixture with 1 part by weight of melamine or dicyandiamide.

3. A self-combustible composition as claimed in Claim 1, which comprises 2 to 3 parts by weight of potassium chlorate in admixture with 1 part by weight of melamine or dicyandiamide.

4. A self-combustible composition as claimed in Claim 1, 2 or 3, which also contains an inert solid diluent which may possess absorbent properties.

5. A fumigating composition, which comprises a self-combustible composition as claimed in any one of Claims 1—3 in admixture with a pest-controlling substance having a flash point not lower than about 180° C. as determined by the open cup method hereinbefore referred to.

6. A fumigating composition as claimed in Claim 5, which also contains an inert solid diluent which may possess absorbent properties.

7. A fumigating composition as claimed in Claim 5 or 6, in which the pest-controlling substance is liquid at ordinary temperature and is absorbed on an absorbent material.

8. A fumigating composition as claimed in Claim 5 or 6, in which the pest-controlling substance is di - (para - chlorophenyl)-trichlorethane, benzene hexachloride or para-chlorophenyl-benzene sulphonate.

9. A fumigating composition substantially as described in any one of the Examples herein.

10. A fumigating device adapted to discharge by combustion the vapour of a pest-controlling substance, which comprises a container having an outlet opening for the vapour and containing a fumigating composition as claimed in any one of Claims 5—9.

11. A fumigating device adapted to discharge by combustion the vapour of a pest-controlling substance, which comprises a container having an outlet opening for the vapour and containing separate from and closely adjacent to one another a self-combustible composition as claimed in any one of Claims 1—4 and a pest-controlling substance having a flash point not lower than about 180° C. as determined by the open cup method hereinbefore referred to.

ABEL & IMRAY,

Agents for the Applicants,

Quality House, Quality Court,

Chancery Lane,

London, W.C.2.

#### PROVISIONAL SPECIFICATION.

#### Improvements in or relating to Fumigating Compositions.

We, THE MURPHY CHEMICAL COMPANY LIMITED, a British Company, of Wheat-hampstead, St. Albans, Hertfordshire, and JOHN LEONARD WALPOLE, a British Subject, of the said Company's address, do hereby declare this invention to be described in the following statement:—

This invention relates to solid self-combustible compositions capable of burning under confined conditions, and which are used for vaporising vaporisable pest-controlling substances in order to produce smokes for fumigation purposes. The pest-controlling substance is usually mixed with the self-combustible composition, but it may be separate therefrom and closely adjacent thereto.

Such self-combustible compositions usually comprise a mixture of a combustible material, for example, a carbohydrate such as sucrose or lactose, and a highly oxygenated compound, for example, potassium chlorate, capable of yielding oxygen to support combustion of the combustible material under confined conditions. It is known that in many cases the smoke produced with these self-combustible compositions is liable to inflame on issuing from the container, in which the composition and pest-controlling

substances are contained, and that this leads to the partial or complete destruction of the pest - controlling substance. In order to prevent the smoke from inflaming it is known to provide one or more perforated baffles within the container so as to form one or more spaces through which the vapours pass before issuing from the container.

The present invention is based on the observation that a self-combustible composition comprising a mixture of melamine (2:4:6 - triamino - 1:3:5 - triazine) or dicyandiamide (cyanoquanidine) with a highly oxygenated compound burns at a sufficiently low temperature to produce a non-inflaming smoke with a pest-controlling substance having a flash point not lower than about 180° C. as determined by the open cup method described in "Standard Methods for Testing Petroleum and its Products" published by the Institute of Petroleum, 11th Edition, 1951, page 221.

Accordingly, the invention provides a self-combustible composition for vaporising vaporisable pest - controlling substances, which comprise a mixture of melamine or dicyandiamide with a highly oxygenated compound.

The invention also includes a fumigating

composition, which comprises the said self-combustible composition in admixture with a pest-controlling substance having a flash point not lower than that stated above. The fumigating composition may be incorporated in the container of a conventional fumigating device or may be formed into tablets or pellets which are burned directly in the atmosphere to produce smoke. Alternatively, the composition may be charged in loose powdered form into open containers and ignited by means of a match, fusee or a fuse, such as a quickmatch fuse, one end of which is inserted in the composition. For the purpose of storage and transit the open container may have a removable lid or cover. However, instead of mixing the pest-controlling substance with the self-combustible composition, it may be arranged separate therefrom and closely adjacent thereto. Thus, the pest-controlling substance may be arranged above or laterally of the self-combustible composition, or it may be contained in one or more receptacles wholly or partially destructible by heat and embedded within the self-combustible composition.

The invention also includes a fumigating device adapted to discharge by combustion the vapour of a pest-controlling substance, which comprises a container in which is incorporated the self-combustible composition and pest-controlling substance either mixed together or arranged separately from one another, and which container has an outlet opening for the vapours. If desired, a fuse for igniting the self-combustible composition may also be provided.

The relative proportions of the highly oxygenated compound and the melamine or dicyandiamide in the self-combustible composition may vary considerably. For example, the proportion of potassium chlorate to melamine or dicyandiamide may range from 0.9 : 1 to 6.5 : 1 parts by weight, and is advantageously within the range of 2 : 1 to 3 : 1.

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The self-combustible composition or fumigating composition may also contain a

chemically inert material, such as china clay, talc, diatomaceous earth or the like, as a diluent or as an absorbent for a low melting pest-controlling substance. Such an addition may also serve to moderate the burning rate and performance of the composition as is well known in the art.

There may also be incorporating in the fumigating composition a stabiliser, such as zinc oxide, magnesium oxide or titanium dioxide, when a pest-controlling substance that tends to decompose during storage with the formation of an acidic product, for example, D.D.T., is present in the composition. This is especially desirable if the composition is to be stored under warm or tropical conditions.

The following Examples illustrate fumigating compositions in accordance with the invention, the ingredients being thoroughly mixed together in powdered form in the stated proportions either by hand through sieves or in a suitable mixer :

#### EXAMPLE 1.

	Parts by weight.	
D.D.T. . . . .	56	90
Potassium chlorate . . . . .	24	
Melamine . . . . .	8	
China clay . . . . .	10	
zinc oxide . . . . .	2	95

The above composition is suitable for the control of White Fly, Tomato Moth, Caterpillar, Capsids, Thrips and other pests under glass.

#### EXAMPLE 2.

	Parts by weight.	
Para-chlorophenylbenzene sulphonate . . . . .	53	
Potassium chlorate . . . . .	22	
Melamine . . . . .	9	105
China clay . . . . .	16	

The above composition is suitable for the control of the eggs and some adult stages of the greenhouse red spider (Tetranychus Telarius L.)

#### EXAMPLE 3.

	Parts by weight.	
D.D.T. . . . .	58	
Potassium chlorate . . . . .	16	
Dicyandiamide . . . . .	8	115
China clay . . . . .	18	

The above composition is suitable for controlling the pests given in Example 1.

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EXAMPLE 4.		The above composition is suitable for	
Parts by weight.		controlling the pest given in Example 2.	10
Para-chlorophenyl-			
benzene sulphonate ..	53	ABEL & IMRAY,	
5 Potassium chlorate ..	22	Agents for the Applicants,	
Dicyandiamide ..	10	Quality House, Quality Court,	
China clay ..	13	Chancery Lane,	
Zinc oxide ..	2	London, W.C.2.	

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